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## APPLICATION NOTE 4110

# DS1865 Quick Reference Guide

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*Abstract: The DS1865 burst-mode PON controller with integrated monitoring provides programming options required to configure the alarms, warnings, lookup tables, and other functions detailed in Application Note 4052, [Quick Reference Guide to the DS1863 Memory Map](#). This programmability necessitates a large register memory map. This application note provides an alternate outline of the register map, which is convenient when programming the device.*

## Introduction

The [DS1865](#) is a burst-mode PON controller with integrated monitoring capabilities. It features seven separate memory tables that are internally organized into eight byte rows. In addition this controller has auxiliary memory, which is EEPROM accessible at the A0h slave address.

## Memory Map of the DS1865

The **Lower Memory** is addressed from 00h to 7Fh. This memory contains alarm and warning thresholds, flags, masks, several control registers, password entry area (PWE), and the Table Select byte. See [Figure 1](#).

**Table 01h** primarily contains EEPROM (with PW1-level access) and some alarm and warning status bytes.

**Table 02h** is a multifunction space that contains configuration registers, scaling and offset values, passwords, interrupt registers, and other miscellaneous control bytes.

**Table 03h** is strictly EEPROM that is protected by a PW2-level password.

**Table 04h** contains a temperature-indexed lookup table (LUT) for controlling the modulation voltage. The modulation LUT can be programmed in 2°C increments over the -40°C to +102°C range. Access to this LUT is protected by a PW2-level password.

**Table 05h** contains another LUT which allows the APC set point to change as a function of temperature to compensate for Tracking Error (TE). The TE LUT has 36 entries that determine the APC setting in 4°C windows between -40°C to +100°C. Access to this LUT is protected by a PW2-level password.

**Table 06h** contains a MON4-indexed LUT for controlling the M4DAC voltage. The M4DAC LUT has 32 entries that are configurable to act as one 32-entry LUT or two 16-entry LUTs. When configured as one 32-entry LUT, each entry corresponds to an increment of 1/32 of the full scale. When configured as two 16-entry LUTs, the first 16 entries and the last 16 entries each correspond to 1/16 of full scale. Either of the two 16-entry sections is selected with a separate configuration bit. Access to this LUT is protected by a PW2-level password.

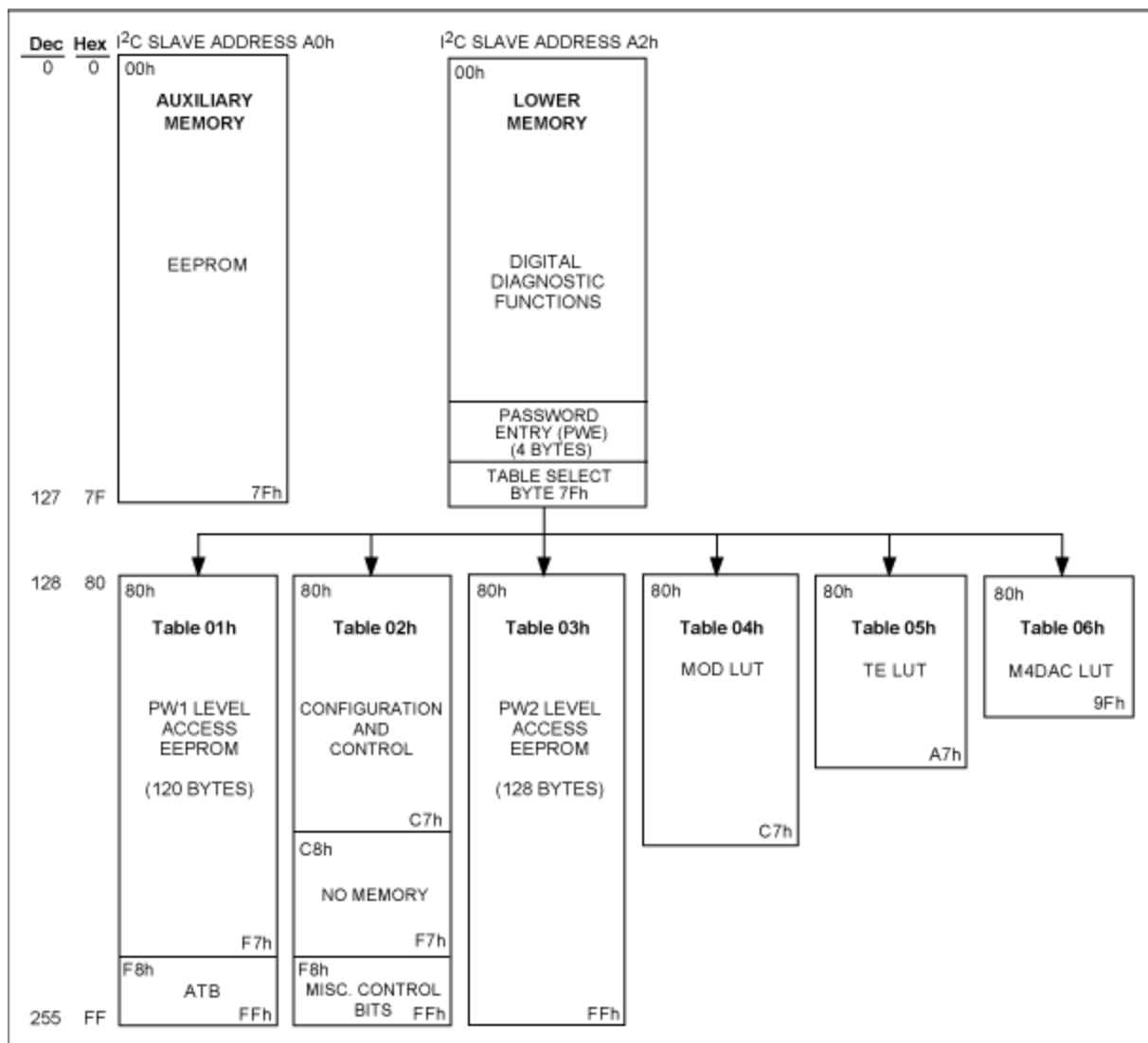


Figure 1. DS1865 memory map.

## Register Reference

The following tables provide an easy reference to the Lower Memory, and Tables 01h and 02h. For a description of the functionality for each bit, please refer to the corresponding register in the DS1865 data sheet. Tables 03h, 04h, 05h, and 08h are LUTs that do not require a separate reference, and thus are not included here. (Please refer to the data sheet for detailed information about these tables.)

**Note:** RSVD is used as an acronym for Reserved.

**Lower Memory Table**

<b>TEMP ALARM HI</b>	00h, 04h	S	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>TEMP WARN HI</b>	01h, 05h	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
<b>TEMP ALARM LO</b>	02h, 06h	S	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>TEMP WARN LO</b>	03h, 07h	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
<b>V<sub>CC</sub> ALARM HI</b>	08, 0C, 10, 14, 18, 1C, 20, 24, 25, 2Ch	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
<b>V<sub>CC</sub> WARN HI</b>									
<b>MON1-4 ALARM HI</b>	09, 0D, 11, 15, 19, 1D, 21, 25, 29, 2Dh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>MON1-4 WARN HI</b>									
<b>V<sub>CC</sub> ALARM LO</b>	0A, 0E, 12, 16, 1A, 1E, 22, 26, 2A, 2Eh	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
<b>V<sub>CC</sub> WARN LO</b>									
<b>MON1-4 ALARM LO</b>	0B, 0F, 13, 17, 1B, 1F, 23, 27, 2B, 2Fh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>MON1-4 WARN LO</b>									
<b>PW2 EE</b>	30h-5Fh	EE	EE	EE	EE	EE	EE	EE	EE
<b>TEMP VALUE</b>	60h	S	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
	61h	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
<b>V<sub>CC</sub> VALUE, MON1-4 VALUE</b>	62, 64, 66, 68, 6Ah	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
	63, 65, 67, 69. 6Bh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>RESERVED</b>	6C, 6Dh	0	0	0	0	0	0	0	0
<b>STATUS</b>	6Eh	FETG STATUS	SOFT FETG	RSVD	TX-F RESET	SOFT TX-D	TX-F STATUS	LOS STATUS	RDYB
<b>UPDATE</b>	6Fh	TEMP RDY	V <sub>CC</sub> RDY	MON1 RDY	MON2 RDY	MON3 RDY	MON4 RDY	RSVD	RSVD
<b>ALARM<sub>3</sub></b>	70h	TEMP HI	TEMP LO	V <sub>CC</sub> HI	V <sub>CC</sub> LO	MON1 HI	MON1 LO	MON2 HI	MON2 LO
<b>ALARM<sub>2</sub></b>	71h	MON3 HI	MON3 LO	MON4 HI	MON4 LO	RSVD	RSVD	RSVD	RSVD
<b>ALARM<sub>1</sub></b>	72h	RSVD	RSVD	RSVD	RSVD	BIAS HI	RSVD	TX-P HI	TX-P LO
<b>ALARM<sub>0</sub></b>	73h	RSVD	RSVD	RSVD	RSVD	BIAS MAX	RSVD	RSVD	RSVD
<b>WARN<sub>3</sub></b>	74h	TEMP HI	TEMP LO	V <sub>CC</sub> HI	V <sub>CC</sub> LO	MON1 HI	MON1 LO	MON2 HI	MON2 LO

<b>WARN<sub>2</sub></b>	75h	MON3 HI	MON3 LO	MON4 HI	MON4 LO	RSVD	RSVD	RSVD	RSVD
<b>RESERVED</b>	76, 77h	0	0	0	0	0	0	0	0
<b>DOUT</b>	78h	RSVD	RSVD	RSVD	RSVD	D3 OUT	D2 OUT	D1 OUT	D0 OUT
<b>DIN</b>	79h	RSVD	RSVD	INV LOSI	MUX LOSI	D3 IN	D2 IN	D1 IN	D0 IN
<b>RESERVED</b>	7Ah	0	0	0	0	0	0	0	0
<b>PASSWORD ENTRY</b>	7Bh	2 <sup>31</sup>	2 <sup>30</sup>	2 <sup>29</sup>	2 <sup>28</sup>	2 <sup>27</sup>	2 <sup>26</sup>	2 <sup>25</sup>	2 <sup>24</sup>
	7Ch	2 <sup>23</sup>	2 <sup>22</sup>	2 <sup>21</sup>	2 <sup>20</sup>	2 <sup>19</sup>	2 <sup>18</sup>	2 <sup>17</sup>	2 <sup>16</sup>
	7Dh	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
	7Eh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>TABLE SELECT</b>	7Fh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>

**TABLE 01h**

<b>PW1 EEPROM</b>	80h–F7h	EE	EE	EE	EE	EE	EE	EE	EE
<b>ALARM<sub>3</sub></b>	F8h	TEMP HI	TEMP LO	V <sub>CC</sub> HI	V <sub>CC</sub> LO	MON1 HI	MON1 LO	MON2 HI	MON2 LO
<b>ALARM<sub>2</sub></b>	F9h	MON3 HI	MON3 LO	MON4 HI	MON4 LO	RSVD	RSVD	RSVD	RSVD
<b>ALARM<sub>1</sub></b>	FAh	RSVD	RSVD	RSVD	RSVD	BIAS HI	RSVD	TX-P HI	TX-P LO
<b>ALARM<sub>0</sub></b>	FBh	RSVD	RSVD	RSVD	RSVD	BIAS MAX	RSVD	RSVD	RSVD
<b>WARN<sub>3</sub></b>	FCh	TEMP HI	TEMP LO	V <sub>CC</sub> HI	V <sub>CC</sub> LO	MON1 HI	MON1 LO	MON2 HI	MON2 LO
<b>WARN<sub>2</sub></b>	FDh	MON3 HI	MON3 LO	MON4 HI	MON4 LO	RSVD	RSVD	RSVD	RSVD
<b>RESERVED</b>	FE–FFh	0	0	0	0	0	0	0	0

**TABLE 02h**

<b>MODE</b>	80h	SEEB	RSVD	RSVD	M4DAC-EN	AEN	MOD-EN	APC-EN	BIAS-EN
<b>T INDEX</b>	81h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>MOD DAC</b>	82h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>APC DAC</b>	83h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>V INDEX</b>	84h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>M4DAC</b>	85h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>DEVICE ID</b>	86h	0	1	1	0	0	1	0	1
<b>DEVICE VER</b>	87h	DEVICE VERSION							
<b>UPDATE RATE</b>	88h	0	0	0	0	SR <sub>3</sub>	SR <sub>2</sub>	SR <sub>1</sub>	SR <sub>0</sub>

<b>CONFIG</b>	89h	FETG DIR	TX-F EN	RSVD	ASEL	RSVD	RSVD	RSVD	RSVD
<b>START-UP STEP</b>	8Ah	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>
<b>MOD RANGING</b>	8Bh	RSVD	RSVD	RSVD	RSVD	RSVD	MOD <sub>2</sub>	MOD <sub>1</sub>	MOD <sub>0</sub>
<b>DEVICE ADDRESS</b>	8Ch	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>COMP RANGING</b>	8Dh	RSVD	BIAS <sub>2</sub>	BIAS <sub>1</sub>	BIAS <sub>0</sub>	RSVD	APC <sub>2</sub>	APC <sub>1</sub>	APC <sub>0</sub>
<b>RIGHT SHIFT<sub>1</sub></b>	8Eh	RSVD	MON <sub>12</sub>	MON <sub>11</sub>	MON <sub>10</sub>	RSVD	MON <sub>22</sub>	MON <sub>21</sub>	MON <sub>20</sub>
<b>RIGHT SHIFT<sub>0</sub></b>	8Fh	RSVD	MON <sub>32</sub>	MON <sub>31</sub>	MON <sub>30</sub>	RSVD	MON <sub>42</sub>	MON <sub>41</sub>	MON <sub>40</sub>
<b>RESERVED</b>	90–91h	0	0	0	0	0	0	0	0
<b>V<sub>CC</sub> SCALE MON1-4 SCALE</b>	92, 94, 96, 98, 9Ah	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
	93, 95, 97, 99, 9Bh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>RESERVED</b>	9C–A1h	0	0	0	0	0	0	0	0
<b>V<sub>CC</sub> OFFSET MON1-4 OFFSET</b>	A2, A4, A6, A8, AAh	S	S	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>
	A3, A5, A7, A9, ABh	2 <sup>9</sup>	2 <sup>8</sup>	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>
<b>RESERVED</b>	AC-ADh	0	0	0	0	0	0	0	0
<b>TEMP OFFSET</b>	A Eh	S	2 <sup>8</sup>	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>
	A Fh	2 <sup>1</sup>	2 <sup>0</sup>	2 <sup>-1</sup>	2 <sup>-2</sup>	2 <sup>-3</sup>	2 <sup>-4</sup>	2 <sup>-5</sup>	2 <sup>-6</sup>
<b>PW1</b>	B0h	2 <sup>31</sup>	2 <sup>30</sup>	2 <sup>29</sup>	2 <sup>28</sup>	2 <sup>27</sup>	2 <sup>26</sup>	2 <sup>25</sup>	2 <sup>24</sup>
	B1h	2 <sup>23</sup>	2 <sup>22</sup>	2 <sup>21</sup>	2 <sup>20</sup>	2 <sup>19</sup>	2 <sup>18</sup>	2 <sup>17</sup>	2 <sup>16</sup>
	B2h	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
	B3h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>PW2</b>	B4h	2 <sup>31</sup>	2 <sup>30</sup>	2 <sup>29</sup>	2 <sup>28</sup>	2 <sup>27</sup>	2 <sup>26</sup>	2 <sup>25</sup>	2 <sup>24</sup>
	B5h	2 <sup>23</sup>	2 <sup>22</sup>	2 <sup>21</sup>	2 <sup>20</sup>	2 <sup>19</sup>	2 <sup>18</sup>	2 <sup>17</sup>	2 <sup>16</sup>
	B6h	2 <sup>15</sup>	2 <sup>14</sup>	2 <sup>13</sup>	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>
	B7h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>FETG ENABLE<sub>1</sub></b>	B8h	TEMP EN	V <sub>CC</sub> EN	MON1 EN	MON2 EN	MON3 EN	MON4 EN	RSVD	RSVD
<b>FETG ENABLE<sub>0</sub></b>	B9h	HTXP EN	LTXP EN	BIAS HI EN	BIAS MAX EN	RSVD	RSVD	RSVD	RSVD
<b>TX-F ENABLE<sub>1</sub></b>	BAh	TEMP EN	V <sub>CC</sub> EN	MON1 EN	MON2 EN	MON3 EN	MON4 EN	RSVD	RSVD
<b>TX-F</b>		HTXP	LTXP	BIAS HI	BIAS				

<b>ENABLE<sub>0</sub></b>	BBh	EN	EN	EN	MAX EN	RSVD	RSVD	RSVD	FETG EN
<b>HTXP</b>	BCh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>LTXP</b>	BDh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>HBIAS</b>	BEh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>MAX IBIAS</b>	BFh	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>
<b>DPU</b>	C0h	RSVD	RSVD	INV LOSI	MUX LOSI	D3 CNTL	D2 CNTL	D1 CNTL	D0 CNTL
<b>RESERVED</b>	C1–C3h	0	0	0	0	0	0	0	0
<b>DAC1</b>	C4h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>RESERVED</b>	C5–C6h	0	0	0	0	0	0	0	0
<b>M4 LUT</b>	C7h	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	DBL_SB	UP_LOWB
<b>MAN IBIAS</b>	F8h	RSVD	RSVD	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>	2 <sup>7</sup>
	F9h	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>MAN_CNTL</b>	FAh	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	MAN_CLK
<b>BIAS DAC</b>	FBh	0	0	2 <sup>12</sup>	2 <sup>11</sup>	2 <sup>10</sup>	2 <sup>9</sup>	2 <sup>8</sup>	2 <sup>7</sup>
	FCh	2 <sup>7</sup>	2 <sup>6</sup>	2 <sup>5</sup>	2 <sup>4</sup>	2 <sup>3</sup>	2 <sup>2</sup>	2 <sup>1</sup>	2 <sup>0</sup>
<b>RESERVED</b>	FD-FEh	0	0	0	0	0	0	0	0

#### Related Parts

**DS1865**

PON Triplexer Control and Monitoring Circuit

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